REMARKS/ARGUMENTS

Claims 1, 3-6, 8-10, 20, 22-25, 27-29, and 39-42 are pending in the present application, of which claims 1, 6, 20, 25, 39, 40, 41, and 42 are the independent claims. Applicants believe that the present application is in condition for allowance, for which prompt and favorable action is respectfully requested.

Claim Rejections – 35 USC § 101

Claims 39-42 are rejected under 35 U.S.C. § 101 for being directed to non-statutory subject matter.

The Office Action rejected claims 39 and 40 by stating "[s]uch claimed apparatus may be interpreted either as software, hardware or combination thereof necessarily includes hardware, is interpreted in its broadest reasonable sense as software/code/instruction [in accordance with application's specification paragraph 1055]. When software system/apparatus is claimed without including a machine or a physical part of the device within the meaning of 35 USC § 101, it is considered non-statutory." Applicants respectfully disagree.

To begin with, each of claims 39 and 40 is explicitly directed to an "apparatus," which constitutes patentable subject matter under 35 U.S.C. § 101. Therefore, Applicants submit that each of claims 39 and 40 is directed to patentable subject matter for at least this reason.

Second, claims may cover both hardware and software embodiments. For instance, in *Overhead Door Corp. v. Chamberlain Group, Inc.*, 194 F.3d 1261, 1271-73 (Fed. Cir. 1999), the court held that one skilled in the art would have understood that a patent's disclosure of a flow diagram represented disclosure of an alternative software embodiment of a switch. The court concluded that the district court should have included software as corresponding structure to the switch means limitation in the patent. *See Id.* at 1273, "The differences in claim language, bolstered by the patentees' statements during reissue proceedings, cause this court to reach a broader construction for claim 5 than for claim 1.... The district court erred in ruling that only the mechanical switch in Figure 2 is 'corresponding structure' for the claimed 'switch means.' 'Switch means,' when properly construed, also covers the software-based embodiment described in Figure 3." Since claims 39 and 40 may cover both hardware and software embodiments, these claims are drawn to patent eligible subject matter under 35 U.S.C. § 101 and are valid.

Further, Applicants respectfully disagree with the Office Action's apparent requirement that claims 39 and 40 explicitly recite hardware in order to be directed to statutory subject matter. As discussed above with reference to the decision in *Overhead Door Corp. v. Chamberlain Group, Inc.*, claims are not limited to hardware embodiments, and may cover both hardware and software embodiments. Because claims may cover both hardware and software embodiments, the claims are not required to explicitly recite hardware to constitute statutory subject matter.

Therefore, Applicants respectfully submit that claims 39 and 40 are directed to patentable subject matter, and respectfully request that the § 101 rejection of these claims be withdrawn.

The Office Action rejected claim 41 by stating "[c]laim 41 recites the limitation on a computer-readable medium storing instructions, which is not only limited to medium of statutory type, is held nonstatutory [specification, paragraph 1057]. The claimed "computer/machine readable medium" must be physical structure, not a signal." The Office Action rejected claim 42 under the same rationale as claim 41. Applicants respectfully disagree.

First, paragraph [1057] of the present application does not disclose that a computer-readable medium is a signal, and therefore does not support the Office Action's contention that the computer-readable medium recited in claims 41 and 42 is a signal. Further claims 41 and 42 are directed to an apparatus, which is a computer-readable medium encoded with a data structure that defines structural and functional interrelationships between the data structure and the medium that permit the data structure's functionality to be realized. Indeed such claims have been held to be statutory. See *in re Lowry*, 32 F.3d 1579, 32 U.S.P.Q.2d 1031 (Fed. Cir. 1994) and *In re Beauregard*, 53 F.3d 1583, 1583-84 (Fed. Cir 1995).

Therefore, Applicants respectfully submit that claims 41 and 42 are directed to patentable subject matter, and respectfully request that the § 101 rejection of these claims be withdrawn.

Claim Rejections – 35 USC § 103

Claims 1, 3-6, 8-10, 20, 22-25, 27-29 and 39-42 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Smeets (U.S. 6,813,625) (hereinafter "Smeets") in view of Hakaste (U.S. 6,813,355) (herein after "Hakaste"). Reconsideration and withdrawal of these rejections are respectfully requested.

Claim 1 is directed to a method for scrambling information bits in a communications system. The method includes determining a scrambling sequence based on a metric of system

time, wherein the determining the scrambling sequence includes determining the metric based on a subinterval of a system time interval of a control channel in which the information bits of a control message are to be transmitted, and scrambling the information bits of the control message with the determined scrambling sequence in accordance with the metric. Applicants submit that none of the applied references, taken individually or in combination, teaches or suggests the method of claim 1.

The method of claim 1 prevents repetitive false alarm events due to repetitive control message contents transmitted on a control channel (e.g., F-PDCCH). As discussed in the present application, the same control message may be transmitted on the control channel from time to time. See, e.g., paragraph [1016] of the present application. When the contents of a control message result in a false alarm event, the false alarm event may be repeated when the same control message contents are retransmitted on the control channel, leading to repetitive false alarm events. See, e.g., paragraph [1042] of the present application. The method of claim 1 prevents repetitive false alarm events by scrambling the information bits of a control message with a scrambling sequence based on a metric of system time, in which the metric is determined based on a subinterval of a system time interval of the control channel. As a result, the scrambling sequence changes for different subintervals of the control channel. Thus, when the same control message contents are repeated at different subintervals of the control channel, each repetition of the control message contents are scrambled with a different scrambling sequence. As a result of the scrambling, the control message contents differ for each repetition, preventing repetitive false alarm events. This is neither taught nor suggested by any of the applied references.

Smeets discloses a device comprising four clock controlled PN sequence generators 201, in which the stepping function of each PN sequence generator 201 is controlled by a respective clock signal. See col. 5, lines 33-45 and Figure 2 of Smeets. At each clock cycle, the clock value C^k_t of each clock signal determines whether the stepping function of the respective PN sequence generator 201 performs one step or two steps to generate one PN value Z^k_t of the respective PN sequence. See col. 5, lines 46-63 of Smeets. If the clock value C^k_t equals 1, then the stepping function performs one step, and if the clock value C^k_t equals 2, then the stepping function performs two steps. See col. 5, lines 58-63 of Smeets. For example, when the clock value C^k_2 equals 2 at clock cycle t = 2, the stepping function of the respective PN sequence

generator performs two steps from X^k_2 to X^k_4 to generate PN value $Z^k_2 = X^k_4$. See col. 5, lines 61-63 of Smeets. Thus, at each clock cycle, the stepping function of each PN sequence generator 201 performs either one step or two steps to generate one PN value based on the respective clock value at that clock cycle.

Smeets also discloses that the device comprises a step pattern subsystem 202 and a function generation means 203. The step pattern subsystem 202 generates the clock signals for the PN sequence generators 201, and determines the four clock values at each clock cycle by selecting one of 6 possible stepping patterns based on a combine control value U_t. See col. 6, lines 27-64 of Smeets. The function generation means 203 combines the PN sequences from the four PN sequence generators 201 into one output sequence. See col. 5, lines 64-67 and col. 6, lines 16-18 of Smeets.

However, Smeets does not teach or suggest at least the feature wherein determining the scrambling sequence includes determining the metric based on a subinterval of a system time interval of a control channel in which the information bits of a control message are to be transmitted, as recited in claim 1.

Admitting that Smeets does not teach the above feature of claim 1, the Office Action relies on Hakaste to cure the admitted deficiencies of Smeets. See page 5 of the Office Action.

Hakaste discloses a method for ciphering information in one time slot, in which the information is divided into blocks having a block size of 114 bits each. See col. 5, lines 33-41 of Hakaste. Hakaste also discloses that a specific ciphering key Kc is created for a connection and sent to both the transmitter and the receiver using the connection. See col. 5, lines 33-41 of Hakaste. Hakaste further discloses that a block specific ciphering key Kcs is created for each block based on the specific ciphering key Kc and a sub-block number BM. See col. 5, lines 42-60. Each block specific ciphering key Kcs is used to cipher the information in the corresponding block (i.e., information sub-block). See col. 6, lines 1-5 of Hakaste.

The Office Action contends that Hakaste teaches "determining a scrambling sequence includes determining the metric based on a subinterval of a system time interval of a control channel in which the information bits of a control message are to be transmitted." See page 5 of the Office Action. In support of its contention, the Office Action merely cites passages and figures of Hakaste without identifying which element in Hakaste is believed to disclose a subinterval of a system time interval of a control channel. As best understood by the Applicants,

the Office Action is relying on a block in the time slot of Hakaste as disclosing a subinterval of a system time interval of a control channel.

The Office Action further contends that "it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine Hakaste with Smeets to utilize the subinterval of a system time interval of control channel for determining the scrambling sequence." See page 5 of the Office Action. Applicants respectfully disagree for at least the reason that one skilled in the art would not have modified Smeets to utilize a block of Hakaste (Examiner's apparent subinterval of a system time interval of a control channel) for determining the PN sequences of Smeets.

It is crucial for the operation of Smeet's device that each clock cycle of each clock signal be equal to the period of one PN value. This is because the stepping function of each PN sequence generator 201 is controlled by the respective clock signal. At each clock cycle, the stepping function of each PN sequence generator 201 performs either one step or two steps to generate one PN value based on the clock value at that clock cycle. As a result, the step pattern subsystem 202 of Smeets must update the clock value of each clock signal for each PN value in order to control the stepping function of the respective PN sequence generator 201 for each PN value. Thus, the operation of Smeet's device requires that the clock cycle of each clock signal correspond to exactly one PN value of a PN sequence.

Modifying Smeets to utilize a block of Hakaste would render the PN sequence generators 201 of Smeets inoperable. This is because each block of Hakaste spans an entire block of information comprising 114 bits. See col. 5, lines 39-41 of Hakaste. As a result, a block of Hakaste is much too large to be used to control the stepping function of a PN sequence generator 201 of Smeets. As discussed above, each clock signal of Smeets is required to have a clock cycle equal to the period of one PN value so that the clock value of the clock signal can be updated for each PN value in order to control whether the stepping function performs one step or two steps for each PN value. In contrast, a block of Hakaste spans an entire block of values, and therefore can not be used to control the steeping function of a PN sequence generator of Smeets. If a clock signal of Smeets where modified to be based on a block of Hakaste, then the clock signal would be unable to control the stepping function of the PN sequence generator for each PN value, which requires that the clock signal operate at a clock cycle equal to the period of one PN value. According to MPEP § 2143.01(V), "[i]f a proposed modification would render the prior art

invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification."

For at least the reasons given above, Applicants submit that claim 1 is patentable over the applied references, and respectfully request that the rejection of claim 1 be withdrawn.

Independent claims 6, 20, 25, 39, 40, 41 and 42 recite features similar to those in claim 1, and are therefore also patentable for at least the same reasons given above for claim 1.

Claims 3-5, 8-10, 22-24, and 27-29 depend from claims 1, 6, 20 and 25, respectively, and are therefore also patentable for at least the same reasons given above for claims 1, 6, 20 and 25. Because each dependent claim is deemed to define an additional aspect of the invention, however, the individual consideration of each on its own merits is respectfully requested.

CONCLUSION

In light of the amendments contained herein, Applicants submit that the application is in condition for allowance, for which early action is requested.

Please charge any fees or overpayments that may be due with this response to Deposit Account No. 17-0026.

Respectfully submitted,

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